

**Response of the
California Transmission Planning Group Technical Steering Committee
To Comments of the
Staff of the California Public Utilities Commission**

January 15, 2009

The California Transmission Planning Group (CTPG) expresses its appreciation for the Comments of the Staff of the California Public Utilities Commission (“Commission Staff”) regarding the CTPG’s Draft Study Plan as presented during the technical conference of December 17, 2009. The Technical Steering Committee is charged with the design and performance of the planning studies being performed by the CTPG and provides these responses to Commission Staff’s Comments. In addition to the responses provided here, the CTPG Technical Steering Committee advises the Commission Staff that many of the concerns and issues raised in the Commission Staff’s Comments will be addressed more completely as the work of the Technical Steering Committee progresses. The responses provided below follow the organization of the Comments as submitted by the Commission Staff.

Topic 1. Intended Use of the “Plan” to be Produced Should be Clarified

The Commission Staff has asked that the CTPG clarify the purposes that may be served by its studies and plans. As the Commission Staff’s Comments acknowledge, the CTPG is a new organization, formed to meet certain of the planning principles adopted by the Federal Energy Regulatory Commission in its Order 890 and governing regional and subregional transmission planning. CTPG has only begun to establish policies, practices and procedures it will use to coordinate the transmission planning processes and plans of its members. Given that the CTPG is in the early stages of its formation and work, CTPG is not in a position to answer many of the Commission Staff’s questions regarding the ultimate definition, scope and applications of its work. Many of the Commission Staff’s questions touch on the aspirations of the CTPG for its studies and plans and we expect that the stakeholders will assist us in determining how we may shape our work to make it meaningful and influential.

At this point in time, the CTPG Technical Steering Committee has been focusing on producing a long-term transmission plan and strategy which is intended to result in the design, construction and operation of the transmission infrastructure that will meet, by the Year 2020, California’s aggressive renewable portfolio standard, i.e., that thirty-three percent (33%) of retail energy deliveries be produced from renewable energy resources. The CTPG members agree with state policymakers that, in order to meet this goal, energy must be harnessed using a diverse portfolio of renewable energy generation technologies and resources, including wind, geothermal, hydroelectricity, biomass and solar. To this end, the CTPG Technical Steering Committee is relying heavily upon the preexisting and foundational work found in the California Renewable Energy Transmission Initiative

(RETI) conceptual transmission plan, a plan that was developed to facilitate access to RETI-identified Competitive Renewable Energy Zones (CREZs).

If CTPG is successful in its work, we expect to produce a robust California-wide transmission plan that will ultimately be used to design and develop the transmission system that assures that the renewable portfolio standard can be met, reliably and efficiently, by all of the transmission providers serving wholesale and retail customers in the state. Because of its diverse and expansive membership, well beyond the transmission owners participating in the California Independent System Operator footprint, and our combined experience and expertise, CTPG is well-positioned to be successful. As our study processes and our studies become more comprehensive and detailed, we expect to serve many of the purposes and objectives identified by the Commission Staff in its Comments and we look forward to refining our studies and results to serve those interests in cooperation with the Commission and its sister agencies.

Unfortunately, CTPG's infancy, as well as the uncertainties associated with the pace, magnitude and geographic pattern of actual renewable resource development, preclude CTPG from assuring the Commission Staff that we can meet all of the objectives or purposes identified in its Comments. Additionally, as the Commission Staff is well aware, planning activities are more about the process than the "finality" of any study result. CTPG's study work will therefore be ongoing and iterative and CTPG's studies will be updated to reflect progress in the development of renewable energy sources and projects. Throughout this study process, the CTPG intends to organize and share assumptions, methodologies and study results with stakeholders and, in turn, we expect the studies will in turn be increasingly informed and refined by stakeholder input.

To the extent we can address some of the Commission Staff's Comments, the CTPG Technical Steering Committee can say that Phase 1 of the CTPG study process is directed toward establishing a preliminary assessment of the impacts of absorbing the output of renewable resources at the thirty-three percent (33%) level indicated for the Year 2020 under various system-peak load conditions. We would then proceed to Phase 2, which is currently anticipated to investigate other system conditions including light load conditions and the effects of the state's emerging once-through cooling requirements. Taken together, the Phase 1 and Phase 2 studies will provide starting data points for future study phases and scenarios that will be informed by stakeholder processes, one of the potential objectives identified in the Commission Staff's Comments. These future studies, in turn, will be used to establish a transmission plan identifying specific transmission projects and strategies that can meet all reliability requirements as the state's electricity system evolves to meet these important state policies. These projects and strategies will themselves be further refined, firmed and, if determined to be superior to identified alternatives, ultimately be proposed for construction.

The CTPG Technical Steering Committee fully agrees with the Commission Staff that it would be helpful for stakeholders to know the intended uses of CTPG's work in

order to assess whether the CTPG is “moving in the right direction” and how to contribute most constructively. We hope this response provides some guidance as to where CTPG and its work stands as of today, and some guidance, albeit general, as to our aspirations over the long term.

Topic 2. Assumed Renewables Additions and Their Rationale Should be Clarified

- a. Please provide the “embedded file” RETI_Net_Short_09-09-23.xls identified on page 18 of the November 22 Draft Study Plan.

The requested file is attached and will be posted to the CTPG website at www.ctpg.us.

- b. Please identify the MW, GWh and locations (e.g., by CREZ) of “under construction” renewable generation and “miscellaneous renewable resource additions” broken out on Slide 11 of the December 17 presentation.

The “under construction” renewable generation (per Slide 11, the “existing and new renewables expected to be on line by end of 2009”) and miscellaneous renewable resource additions were taken from the California Energy Commission’s 2008 Net System Power Report, published July 2009, CEC 200-2009-010-CMF.

- c. In the table presented on Slides 15 and 16, please break down the resources by technology (e.g., solar PV) within each location.

The CTPG Technical Steering Committee does not have this information readily available to it.

- d. Please explain the differences between renewable resource MW shown on the Slide 13 map, versus what is shown on Slides 15 and 16.

The map on Slide 13 of the presentation slides discussed during the December 17, 2009, stakeholder conference call was updated and is now included as Figure S1 and Figure 1 in the CTPG Phase 1 Report.

- e. Has there been interest in, and is there any intention to study, substantial out-of-state renewables from other locations besides those locations shown in the table on slides 15 and 16, such as Arizona, New Mexico or Wyoming? What about Baja, where substantial resource development and interconnection appears likely? Also, what is assumed about state policy regarding the extent to which out-of-state renewable generation must be physically delivered to California in real time,

and how does this affect inclusion of out-of-state renewable generation and its associated transmission, in the studies?

CTPG encourages stakeholders to submit specific suggestions as to scenarios to be studied in future CTPG work. These scenarios could include increased renewable resource development in other states, in Baja, Mexico, and/or in Canada. With respect to state policies and regulations governing the “physical delivery” of renewable resources, CTPG has assumed that the renewable procurement plans submitted to CTPG reflect the understanding and expectation of each load-serving entity as to the amount of renewable energy that can be (a) generated by renewable resources located out-of-state, and (b) counted towards the load-serving entity’s renewable resource goals.

- f. How much distributed renewable generation is included in the mix presently being studied (such as presented on Slides 15 and 16)? Have CTPG members or others expressed interest in studying substantial levels of distributed renewable generation, and what analytic problems will this present?

In calculating California's renewable net short energy position, the CTPG Technical Steering Committee has opted to use the California Energy Commission’s forecast rate of penetration for rooftop solar photovoltaic systems (a form of distributed generation) for the Year 2020; the forecast is for 3,218 gigawatt-hours of energy from this source.

In terms of analyzing substantial levels of distributed renewable generation, such generation is represented analytically as load reduction. If substantially larger amounts of distributed renewable generation are reflected in our studies than is presently the case, the CTPG Technical Steering Committee would expect to model such generation explicitly in power-flow and stability studies. As indicated in the Commission Staff’s Comments, there are several technical issues associated with doing this analysis. For example, specific machine and source data will be required to determine whether distributed renewable generation resources can be expected to remain on-line during specific contingency conditions, data which is not available at this time. This will necessarily involve detailed modeling of the dynamic response of distribution load and well as of the distributed renewable generation included in the studies. The CTPG Technical Steering Committee currently believes that the study of a large increase in the penetration of distributed renewable generation should be deferred until more information is available to enable an assessment of the dynamic load representation.

- g. Have the CTPG study team, CTPG members or others provided information for, or expressed interest in, multiple (alternative) renewable generation cases for study, rather than a single case? What cases have been proposed, and are being considered?

A number of generation dispatch patterns and load levels are being investigated for the renewables scenario being studied. The study results should provide information

to allow development of other renewables scenarios. In developing the present renewables scenario being studied, the CTPG Technical Steering Committee used the information developed by RETI as its starting point. Because most of the members of CTPG are also purchasers of the renewable resources, there was an opportunity to fine-tune the set of resources identified by the RETI studies by incorporating members' renewable procurement plans. These procurement plans -- which to a significant degree are based on signed Power Purchase Agreements (PPAs) -- suggest that the actual quantities, mix and location of renewable resource additions may be significantly different than what was developed by RETI. (Please see Section 4.3, Renewable Generation Portfolios, of the 2010 Initial CTPG 2020 Study Report). The CTPG believes that incorporating this information will improve the accuracy and usefulness of its study results.

For the future, CTPG encourages stakeholders to submit specific suggestions as to scenarios to be studied in future CTPG work. These scenarios could include different quantities, technologies, and geographic patterns of additional renewable resource development than reflected in CTPG's current study plans. Additionally, the CTPG is evaluating the Commission Staff's recommendations regarding the use of RETI's study results as to specific CREZs, as well as the California ISO's conceptual planning process derived from RETI's work, as a guide for CTPG's future work. The CTPG Technical Steering Committee looks forward to continuing discussions with the Commission Staff in this regard.

Topic 3. It is Essential to Consider Multiple Renewable Resource Scenarios?

As mentioned above, the CTPG Technical Steering Committee intends to investigate different renewable resource scenarios in future study phases and we are in full agreement with the Commission Staff's recommendation in this regard. As to the more specific question posed in the Commission Staff's comments as to whether the CTPG plans to include only "robustly needed" transmission elements in plan(s) to be produced, which would require assessing multiple resource scenarios to also include "conditionally needed" transmission elements, the CTPG Technical Steering Committee would defer answering that question until after the studies are completed for these additional scenarios and only after reasonable wires and non-wires alternatives have been considered. At that point, we agree with the implication raised by the Commission Staff's Comments that updates to CTPG's initial conceptual transmission plan will be in order.

A major part of CTPG's study work encompasses contingency-based analyses defined by potentially adverse system conditions. Where contingencies reveal reliability criteria violations, potential mitigation alternatives are identified. These mitigation alternatives can include different CREZ connection schemes, different transmission upgrades, remedial action schemes that trip generation and/or load for given contingency

conditions¹, pre-contingency generation redispatch, increased levels of distributed generation, greater reliance on demand side programs, different locations and patterns of renewable resource additions, and possibly new generation at strategic locations. Future phases of CTPG's work will evaluate the technical feasibility and economic competitiveness of various alternatives that mitigate the identified reliability criteria violations.

Topic 4. The Actual Resources that are Included (and Backed Down) in Power Flow Cases Should be Transparent and Vetted

The CTPG agrees that it is important to report clearly which generators are being backed down in what amounts and locations to accommodate renewable generation additions in each study case. This information is available in the power-flow cases developed by CTPG members. Upon written request, CTPG will provide these cases to stakeholders holding appropriate nondisclosure agreements with the WECC.

Topic 5. Assumed Measures (Including Transmission) to Address Local Reliability Should be Clearly Identified

The CTPG Technical Steering Committee agrees with the Commission's Staff Comments that assumed measures addressing local reliability requirements and needs should be identified. In this regard, CTPG's study plan explicitly addresses potential reliability issues surrounding back-down of fossil units required to support local area reliability. The CTPG is also in the process of studying the implications of retiring coastal fossil-fired generating units as a result of the state's emerging once-through cooling policies. In connection with current and future studies, CTPG intends to disclose potential reliability issues and identify mitigation alternatives. This should enhance efforts to develop a transmission plan that effectively and efficiently addresses the reliability requirements for local areas.

Concerning the Commission Staff's questions regarding the use of a number of "snapshots" versus modeling each of the 8760 annual operating hours, the CTPG notes that NERC Standards TPL-002 and -003, which require investigation of contingencies, specifically allow for transmission planning studies to be performed and evaluated only for those single and multiple contingencies that would produce the more severe system results or impacts. Satisfying applicable reliability criteria therefore does not require an evaluation of all 8760 annual operating hours. Our assumption, reflected in the NERC reliability standards cited previously, is that infrastructure additions or other measures that mitigate reliability criteria violations during the more severe system conditions will

¹ For more detail on the option of tripping generation, see CTPG's response to comments submitted to CTPG by the Bay Area Municipal Transmission Group following the CTPG's December 17, 2009, stakeholder meeting.

be sufficient to mitigate any reliability criteria violations that occur during other, less severe, system conditions.

In determining which infrastructure additions or other measures should be included in a transmission plan, however, it is necessary to have a sense of how the various alternatives compare across all reasonably likely system conditions, i.e., it is necessary to compare the benefits of different mitigation strategies with the costs of those strategies. For example, overloads that are predicted to occur only a few hours a year might be mitigated through generation redispatch because the projected cost of the redispatch (reducing the output of relatively efficient generators on one side of the otherwise overloaded path and increasing the output of relatively less efficient generators on the other side of the otherwise overloaded path) would be less than the cost of the infrastructure addition that would eliminate the overload. On the other hand, if the costs of generation redispatch are projected to be high, then mitigation might best be accomplished with a transmission infrastructure addition whose estimated costs are lower than the redispatch costs. Determining the frequency with which such generation redispatch would be needed, requires consideration of 8760 hours, or an equivalent analytical technique which is sufficiently representative of all system conditions expected during the course of a year.

The CTPG Technical Steering Committee agrees with the suggestion of the Commission Staff that its future study work will need to undertake such analyses in order to make informed judgments as to which mitigation alternatives are in the best interest of consumers and therefore should be included in updates of CTPG's initial conceptual transmission plan.

Topic 6. Limitations of “Snapshot” Power Flow Studies for Long Term Planning Should be Addressed

The number of power flow snap shots and the conditions to be investigated as part of the CTPG study process will depend on the experience and expertise of the transmission planners involved in the planning process, the results of the initial studies, and information as to future loads and resources. The CTPG Technical Steering Committee will select “snapshots” covering peak and off-peak conditions, different dispatch and power transfer patterns that reflect the more severe system conditions (as required by NERC standards) and augmented by sensitivity studies.

Through these studies, potential transmission problems would be identified and alternative solutions can then be developed. Such alternative solutions can include different CREZ connection schemes, different transmission upgrades, remedial action schemes that trip generation and/or load for given contingency conditions², pre-

² For more detail on the option of tripping generation, see the response to comments submitted to CTPG by the Bay Area Municipal Transmission Group following the CTPG's December 17, 2009, stakeholder meeting.

contingency generation redispatch, increased levels of distributed generation, greater reliance on demand side programs, different locations and patterns of renewable resource additions, and possibly new generation at strategic locations. The potential solutions can be tested in the aggregate. As discussed under Topic 5, as CTPG's studies move forward, the CTPG will evaluate and update its initial conceptual transmission plan so that all applicable reliability standards are met with transmission infrastructure additions and/or other mitigation measures whose projected life-cycle benefits (relative to a reference case that also meets all applicable reliability standards) exceed estimated life-cycle costs.³

³ If the estimated life-cycle costs exceeded the life-cycle benefits, then it would be economically preferable to pursue the mitigation measures included in the reference case.